

U.S. Patent Application Serial No. **10/649,732**
Response filed January 22, 2008
Reply to OA dated November 26, 2007

REMARKS

Claims 12-31 and 33 are pending in this application, with claims 30 and 31 withdrawn from consideration. Claims 22 and 33 are allowed. No amendment is made in this Response. It is believed that this Amendment is fully responsive to the Office Action dated **November 26, 2007**.

Claims 12-21 and 23-29 are rejected under 35 U.S.C. §103(a) as being unpatentable over Takita et al. (U.S. Patent No. 5,051,183) as set forth in the previous Office action in view of Asami et al. (4,174,426). (Office action paragraph no. 3)

The rejection of claims 12-21 and 23-29 is respectfully traversed, and reconsideration of the rejection is requested.

In the amendment to claim 12 made on August 15, 2007, and entered in the RCE of September 10, 2007, the treatment step was amended to comprise "directly bringing the gel-like formed article into contact with a hot solvent." The Examiner now states that Asami et al. discloses treating a formed membrane with a solvent at temperatures up to the boiling point of the solvent, citing column 9, line 50, to column 10, line 12. The Examiner states that it would have been obvious to incorporate this step into the method of Takita et al. "in order to change the physical characteristics of the membrane, for example by swelling the membrane." The Examiner also cites Asami at column 10, lines 9-12, as disclosing that treatment times can be shortened by heating the solvent.

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In traversing the rejection, Applicant respectfully submits that there is no motivation for the combination of Takita and Asami proposed by the Examiner, and that no *prima facie* case of obviousness can be made over these references.

Asami discloses a method of improving characteristics of a cation-exchange membrane by swelling in a water-miscible organic solvent and treating further with hydrochloric acid. The cation-exchange membrane is made of one or more **fluorinated polymers having cation-exchange groups** (abstract; column 1, lines 32-35). The fluorinated polymers for which the method is applicable are disclosed in column 4, line 8, to column 9, line 35, in which a variety of sulfonic acid type fluorinated polymer, carboxylic acid type fluorinated polymers, sulfonic acid and carboxylic acid type fluorinated polymers, and the fluorinated monomers used to make these polymer are listed. The swelling operation is disclosed in column 10, lines 5-12, in which the membrane is dipped in the water-miscible solvent at a temperature from 0 °C to the boiling point of the solvent. The membrane is then treated with hydrochloric acid (column 10, line 40).

However, Takita specifically discloses a microporous **polyolefin** membrane (see column 4, lines 54-59). In addition, there is **no disclosure** in Takita that this is a cation-exchange membrane, nor of any cation-exchange groups, which a cation-exchange membrane would require. **Takita, therefore, does not deal with cation-exchange membranes made of fluoropolymers.**

Since Asami's disclosure is **specifically directed to cation-exchange membranes made of fluoropolymers**, there is no suggestion in either reference for application of Asami's method to

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Takita's membranes, which are not fluoropolymers and are not cation-exchange membranes. Applicant therefore disagrees with the Examiner's contention that it would have been obvious to use Asami's treatment step in the method of Takita et al. "in order to change the physical characteristics of the membrane, for example by swelling the membrane."

Note, in this regard, that Asami indicates in column 10, lines 56-58, that: "The swelling of the membrane of the **fluorinated polymer** is caused by the effect of **the cation-exchangeable groups**" (emphasis added). That is, there would only be a suggestion or motivation to use Asami's method in the case of a **fluorinated polymer with cation-exchangeable groups**. Since Takita's membrane is not a fluoropolymer and does not have cation-exchangeable groups, there is no reasonable expectation of any effect on Takita's membrane from Asami's solvent treatment.

Moreover, the characteristics improved by Asami's method are (1) high cation transport number and (2) low electric resistance of the membrane (column 1, lines 28-44). There is no indication in Takita that these are parameters to be improved. Again, this argues against any motivation to apply Asami's method to Takita's membranes.

Applicant therefore submits that claims 12-21 and 23-29 are not obvious over Takita et al. (U.S. Patent No. 5,051,183) and Asami et al. (4,174,426), taken separately or in combination.


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If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the applicant's undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, the applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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